



Highlights of the California Energy Commission's **2017 ACCOMPLISHMENTS**



DEDICATIONS

Jackalyne Pfannenstiel

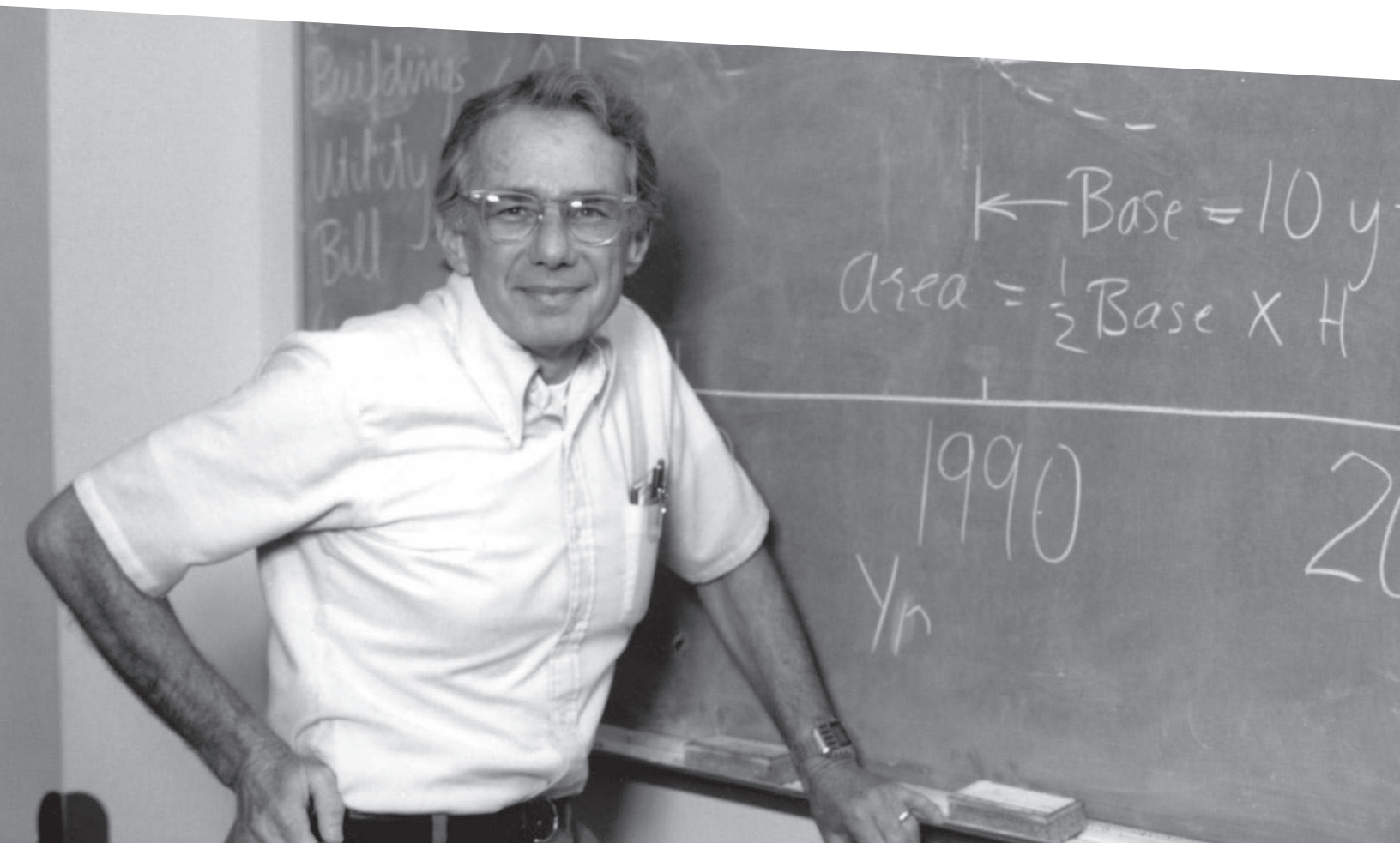
Jackie was an energy pioneer who broke through many glass ceilings. She was appointed to the Energy Commission in 2004 and served as chair from 2006 to 2009, becoming the first woman to serve in the role.



In memory of two California Energy Commissioners who passed away in 2017.

Arthur Rosenfeld

Art served as a commissioner from 2000 to 2010. He pioneered and championed the energy efficiency standards that have made California an international leader in energy conservation and sustainability.



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Desire for action drives the researchers, scientists, engineers and other dedicated employees of the California Energy Commission.

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In California, greenhouse gas emissions from the electricity sector are down 24 percent from where they stood in 1990. That demonstrates significant progress, but so much more needs to be done.

The Global Carbon Project, composed of a group of climate researchers from around the world, reported that after three years of near-negligible change, global carbon dioxide emissions are expected to rise. Even if emissions remained flat, the hope of containing global temperatures to no more than 2 degrees centigrade seems overly optimistic without greater action.

Desire for action drives the researchers, scientists, engineers, and other dedicated employees of the California Energy Commission. Their work is captured in this, the 2017 California Energy Commission Accomplishments Report. I am pleased to present it to you as a measure of the work done on behalf of all Californians as we pursue energy efficiency savings for homes and businesses, clean energy throughout the grid, realistic ways to reduce our reliance on fossil fuels, and assurance that energy is accessible to all, in every neighborhood, rich or poor.



The Energy Commission is also at the forefront of assuring Californians that they have the electricity and natural gas they need. Teaming with other energy experts, Commission staff has recommended dozens of mitigation measures for Southern California in response to limited natural gas pipeline capacity, natural gas storage capacity, and available electricity imports.

With the same commitment, the Commission has developed guidelines to help the publicly owned utilities prepare plans to increase the use of renewable energy and reduce greenhouse gas emissions. The Commission adopted targets to achieve a doubling of energy efficiency for gas and electricity statewide by 2030. The Commission has adopted regulations for computers and light-emitting diode (LED) lighting to capture energy efficiency gains. The Proposition 39 program crossed the threshold of \$1 billion distributed to install energy efficiency advances and solar installations, making school buildings better learning environments and saving schools money that can be used for education programs. The Commission launched the California Electric Vehicle Infrastructure Project (CALeVIP) to continue providing the charging stations needed for an expanding fleet of zero- and low-emission vehicles. Our effort to increase the installation of solar arrays on homes directed its attention to low-income households and disadvantaged communities. The team that licenses power plants has combined forces with the California Public Utilities Commission to begin assisting with

the environmental review of transmission lines. The Commission's effort to support innovation continues to push the envelope as we encouraged farmers, microgrid developers, and energy entrepreneurs to pursue California's energy goals. We have also been among the leaders in research and planning to adapt our energy systems to the climate-change-induced challenges of increased fire risk and rising sea level.

Add to these accomplishments stronger relations with China, Mexico, Germany, and our friends around the world as the lessons learned in California and elsewhere are shared on a global stage for everyone's benefit.

It has been a productive year due to the leadership of our commissioners, our talented and dedicated staff members, and engaged stakeholders who take the time to work with those of us in government. I appreciate the professionalism, collaboration, and willingness to share good ideas. While there are challenges ahead of us that loom large like mountains, we move forward one step at a time.

Sincerely,



Chair Robert B. Weisenmiller

California Energy Commission



ADVANCING ENERGY POLICY

Shifting to Integrated Resource Planning

*The fact that the electricity sector has **reduced greenhouse gas emissions by 24 percent below 1990 levels** is testament that it can be done. To make further advances, additional planning is needed. In 2017, the Energy Commission prepared guidelines that the publicly owned utilities (POUs) are expected to follow as they develop integrated resource plans. The guidelines call for the utilities to prepare plans that describe how each will meet their greenhouse gas emission targets and ramp up the deployment of clean energy resources.*



Establishing Energy Savings Targets

The Energy Commission adopted targets to double energy efficiency savings in electricity and natural gas use by 2030. Developed cooperatively with the California Public Utilities Commission (CPUC) and the POU, these targets will help California achieve the goal to double energy efficiency savings by 2030 as required by the Clean Energy and Pollution Reduction Act of 2015 (De León, Senate Bill 350).

Implementing Energy Benchmarking for Existing Buildings

The Energy Commission established regulations for the energy performance benchmarking program under Assembly Bill 802 (Williams). Energy benchmarking is the measurement of a building's energy performance over time relative to similar buildings. This program provides data that building owners can use to implement improvements that reduce energy use and increase financial savings.

Leading California's Energy Policies

The Energy Commission released the *Draft 2017 Integrated Energy Policy Report (IEPR)*, which examines actions California must take to meet the state's environmental goals while maintaining energy reliability and controlling costs. The *IEPR* covers a range of topics, including the implementation of SB 350, transportation electrification, energy efficiency, and barriers faced by disadvantaged communities.

Enabling Benefits for Low-Income Customers

The Energy Commission began implementing 12 recommendations for state agencies to address the barriers faced by low-income customers in accessing energy efficiency, weatherization, and renewable energy resources. The recommendations also address contracting barriers faced by small businesses in disadvantaged communities.

Managing Peak Energy Consumption

The Energy Commission released the *Draft California Energy Demand Updated Forecast, 2017-2027*, which forecasts expected electricity sales and peak demand for California over the next 10 years. Stakeholders, such as the California Independent System Operator (California ISO), rely on the forecast for transmission planning, while the CPUC uses the information for energy procurement.

Coordinating Support for Emergency Response Operations

The Energy Commission assisted the Governor's Office of Emergency Services to provide petroleum infrastructure situational awareness, ensuring adequate fuel supplies for emergency services. The Energy Commission used its data collection authority and industry expertise to keep the Office of Emergency Services informed of petroleum supply issues and the status of petroleum infrastructure assets.

Assuring Power Is Available When Needed

The Energy Commission, in cooperation with other energy agencies, issued two risk assessments focused on Southern California, where pipeline outages and the 2015 natural gas leak at the Aliso Canyon storage facility have caused a tight energy market. Furthermore, to increase the resiliency of the energy sector, the Energy Commission pressed for the permanent closure of the Aliso Canyon facility within 10 years.



ACHIEVING ENERGY EFFICIENCY

Saving 29 Percent More Energy Than International Standards

*In 2017, the Energy Commission demonstrated that California continues to lead the nation and the world in energy efficiency standards as the state gets more bang for the buck when managing energy usage in buildings. The Commission compared California's 2016 Building Energy Efficiency Standards to national and international standards. The comparison found California standards deliver 29 percent more energy savings than national and international standards. **That savings is equal to the electricity demand of 300,000 additional California homes annually.** Energy savings translate into financial savings for Californians and the standards developed in California get adopted around the world.*



Leading With Appliance Standards

The Energy Commission adopted regulations in response to the changes in technologies for residential pool pump motors, computers, and LED lighting to ensure that new products sold in California perform efficiently, save consumers money, and reduce greenhouse gas emissions.

Saving Schools Money

The Energy Commission approved funding totaling more than \$400 million for nearly 575 energy efficiency projects in the state's K-12 schools. This funding – commonly called the Proposition 39 program – benefits hundreds of local educational agencies. Cumulatively, the Energy Commission has approved more than \$1 billion in funding for energy efficiency and clean energy generation projects. These investments help make school buildings more comfortable, create better learning environments, and save schools money.

Enforcing Compliance

The Energy Commission tested more than 85 electrical and water appliances to determine if the products met California energy efficiency standards. Of those tested, 59 percent did not meet existing standards. Failing products included automotive battery chargers, small battery systems used for garden equipment, electric scooters, pool pumps, showerheads, spas, and wine chillers. Since the compliance program started in 2015, the Energy Commission has investigated and closed 60 cases, ensuring products sold meet energy efficiency standards and provide the energy savings expected by consumers.

Renovating Local Government Buildings

The Energy Commission awarded 13 grants to local governments for more than \$10 million through the Local Government Challenge program. The program helps local governments develop innovative solutions to improve energy performance in communities. Projects vary from accelerating multifamily building upgrades to installing solar systems.

Conserving Energy

The Energy Commission funded loans for more than \$10 million in projects, including a hydroelectric project in Amador County, solar photovoltaic projects in Lake Arrowhead and Monterey, and lighting upgrades in the cities of San Rafael and Clovis. The 1 percent interest loans are funded through the Energy Conservation Assistance Act.

Exceeding Building Standards

The Energy Commission approved 14 local building energy efficiency ordinances that provide greater efficiency than the state building standards require. The local ordinances range from improving energy efficiency to adding onsite renewable generation. The Energy Commission worked with investor-owned utilities to develop a model solar ordinance for local governments accompanied by a cost-effectiveness analysis, which leverages current state and federal incentive programs.



TRANSFORMING TRANSPORTATION

Planning California's Transportation Future

*The Energy Commission is working with partners in state and local government, as well as private stakeholders, to support adoption of cleaner transportation powered by alternative and renewable fuels. As it stands, **transportation is directly responsible for 39 percent of California's greenhouse gas emissions**. As part of the state's strategy to reduce these emissions, the Energy Commission released the 2017-18 Investment Plan Update for the Alternative and Renewable Fuels and Vehicle Technology Program. The program invests up to \$100 million annually in a broad portfolio of advanced technologies that help California meet its greenhouse gas reduction goals, improve air quality, and reduce petroleum dependence. Nearly \$750 million has been invested in nearly 600 projects through the program.*



Expanding Electric-Vehicle Charging Infrastructure

The Energy Commission awarded more than \$15 million to establish and launch the California Electric Vehicle Infrastructure Project (CALeVIP). CALeVIP, working with partners to meet local needs, will design and implement electric vehicle charger incentive projects throughout California. The first project, in Fresno County, was launched in December 2017. Up to \$200 million may ultimately be awarded through CALeVIP.

Clean Fuels Workforce Development

The Energy Commission awarded \$1 million to implement workforce development pilot programs for clean fuel careers at high schools throughout California, focusing on underserved, underrepresented, and disadvantaged communities, and in regions impacted by poor air quality. The Energy Commission also awarded \$1 million to fund specialized training courses in alternative fuels and alternative fuel vehicles at community colleges.

Biofuels Reduce Greenhouse Gas Emissions

The Energy Commission awarded more than \$21 million to six projects for the annual production of 30 million gallons of low-carbon biofuels. The projects will encourage in-state production of cleaner transportation fuels, reducing petroleum imports from other states and foreign countries.

Promoting Sustainable Freight Transportation

The Energy Commission awarded more than \$24 million for sustainable freight transportation projects at the Los Angeles and Long Beach ports to accelerate deployment of zero-emission technologies. The efforts will reduce greenhouse gas emissions and criteria air pollutants, improving air quality and public health at the ports and surrounding disadvantaged communities.

Growing Hydrogen Refueling Network

The Energy Commission approved more than \$33 million to develop 16 hydrogen refueling stations. To date, 65 stations have been funded and 31 are open. The Energy Commission is committed to investing in an initial network of 100 public hydrogen stations.

DC Fast Chargers for Interregional Corridors

The Energy Commission approved more than \$2.4 million to install electric vehicle, direct current, fast-charging stations at sites along U.S. 101 and state Route 152. This funding completes the Energy Commission's investments to install charging stations on interregional corridors and completes California's portion of the West Coast Electric Highway. These charging stations will build consumer confidence in electric vehicles as access to quick recharging capabilities increases.

Ride-Share Services With Zero-Emission Vehicles

The Energy Commission awarded nearly \$3 million to demonstrate innovative electric-vehicle services in California, including a fuel cell electric vehicle car-sharing platform in the Inland Empire. The funding also supports electric vehicle car-sharing programs for affordable housing and senior housing residents in the Central Valley and the Bay Area, as well as a ride-sharing service using battery-electric vehicles for students at Fresno City College.



DEVELOPING RENEWABLE ENERGY

Increasing Solar on New Homes

*In 2017, the Energy Commission's New Solar Homes Partnership (NSHP) continued to forge a path in the adoption of solar for new housing. A new NSHP Guidebook was adopted, introducing an additional incentive for affordable housing projects located in disadvantaged and low-income communities. **Participation from affordable housing developers in 2017 increased by more than 300 percent compared to 2016.** The NSHP program now has accounted for nearly 75,000 residential units with solar. The focus on outreach to low-income communities is a key facet of the NSHP and dovetails with recently released research that found that the energy burden for medium- and low-income households was more than twice that of the average household.*



Increasing Renewable Energy

The Energy Commission determined if renewable facilities meet the requirements to be eligible to participate in California's Renewables Portfolio Standard (RPS), and verified that procurement from these facilities is eligible. SB 350 raised the RPS requirements from 33 percent by 2020 to 50 percent by 2030. In 2017, 30 percent of the state's electricity was from renewable sources, demonstrating that the state is on pace to reach, if not exceed, its renewable energy goal.

Verifying POUs Hit Renewable Targets

The Energy Commission approved the POUs' first RPS verification results, which covered 2011 to 2013. For the first compliance period, 42 POUs were collectively just shy of 20 percent renewable energy during the compliance period, with 26 meeting or exceeding the RPS requirement.

Promoting Geothermal Energy

The Energy Commission awarded nearly \$5 million in grants to geothermal projects. The awards included \$1.6 million to Modoc County for a geothermal resource drilling project and \$1.4 million to Green Fire Energy, Inc. for demonstration of a novel water-free method of extracting energy from hot, dry rock.

Developing Offshore Wind

The Energy Commission led a joint committee with the United States Bureau of Ocean Energy Management to explore development of offshore wind. Seattle-based Trident Winds proposed the first offshore wind farm in California, roughly 33 miles off the coast of Morro Bay.



EVALUATING POWER PLANTS

Ensuring Power Plants are Safe and Environmentally Acceptable

*The Energy Commission is responsible for the certification and compliance of thermal power plants 50 megawatts and larger, including all project-related facilities. The Commission's jurisdiction covers publicly and privately-owned lands. The Commission's role ensures facilities are reviewed expeditiously, and **it ensures that Californians have reliable, safe, and affordable electricity.***



Overseeing Transmission Licensing

After signing a five-year interagency agreement with the CPUC in 2017, the Energy Commission began providing technical services for environmental impact documents and transmission planning analysis. It is an expertise the Energy Commission developed from decades of evaluating issues around the licensing of power plants. The CPUC's review of infrastructure regulatory applications requires a comprehensive environmental quality review and an oversight process for licensing transmission lines, consistent with the California Environmental Quality Act (CEQA).

Monitoring Approved Power Plants

The Energy Commission oversaw environmental and regulatory compliance for about 100 power plants, including 29,600 megawatts of power at 84 natural gas-fired plants, 1,445 megawatts at four solar power projects, and more than 1,000 megawatts of geothermal power at 11 geothermal power plants.

Improving Power Plant Compliance

The Energy Commission upgraded power plant operational inspection, investigation, and enforcement. Since 2016, eight compliance advice letters have been issued clarifying conditions of certification and corrective actions required.

Updating Tribal Consultation Plan

The Energy Commission adopted revisions to the tribal consultation policy first adopted in 2014. The policy outlines the tribal consultation process and suggests ways to foster long-term relationships. Revisions ensure the policy is consistent with the requirements of Assembly Bill 52 (Gatto), which amends CEQA to include additional considerations regarding Native American tribes and tribal resources.



INVESTING IN ENERGY INNOVATION

Managing Innovation

*For more than 30 years, the Energy Commission has managed research programs that make energy choices cleaner, more reliable, and less costly. In 2017, the Energy Commission approved 99 projects totaling \$162 million through the Electric Program Investment Charge (EPIC) program and the Natural Gas Research, Development and Demonstration program. About **38 percent of the EPIC program's technology demonstration and deployment projects were headquartered or demonstrated in disadvantaged communities**. The Energy Commission also approved the EPIC 2018-2020 Triennial Investment Plan. The plan proposes an investment strategy to remove market barriers to the deployment of distributed energy resources, creates a market for energy storage, increases the competitiveness of renewable generation, and advances solutions for continued energy savings in buildings.*



Providing Seed Grants

The Energy Commission supported energy innovators through the Energy Commission's California Sustainable Energy Entrepreneur Development (CalSEED) initiative. These seed grants provide up to \$150,000 in funding for clean energy project concepts that have not yet reached the prototype stage. During 2017, grants totaling more than \$4 million were awarded to 28 entrepreneurs. The initiative also provided entrepreneurs access to networks with academic, business, and professional development resources.

Helping California Farmers

The Energy Commission awarded \$7.5 million for water and energy efficiency projects supporting Central Valley farmers. The projects reduce the burden on the power grid by maximizing irrigation schedules and alerting farmers to leaks in pipes and equipment.

Promoting Microgrids

In collaboration with the CPUC and California ISO, the Energy Commission developed a roadmap for timely adoption of microgrid technology. The roadmap, developed with stakeholders including utilities, microgrid owners, and manufacturers, will help broaden the use of the technology by overcoming barriers such as cost and regulatory issues that have held back widespread deployment.

Supporting Research for Disadvantaged Communities

The Energy Commission held workshops throughout the state to give residents in disadvantaged and low-income communities an opportunity to participate in discussions about clean energy research and development products, strategies, and applications that could help meet residents' needs. Information from the workshops was incorporated into the *EPIC 2018-2020 Triennial Investment Plan*.

Researching Piezoelectric

The Energy Commission awarded grants totaling more than \$2 million to the University of California at Merced and PYRO-E, LLC to develop pilot-scale projects that harvest electricity by embedding piezoelectric materials in roadways. Piezoelectric materials generate electricity when subjected to mechanical stresses, vibrations, and compression, such as when embedded in a road and driven over by a vehicle. As a renewable energy source, it could provide substantial consumer savings.



MAINTAINING STRONG PARTNERSHIPS

International Cooperation

*While California emits a mere 1 percent of global greenhouse gas emissions, Energy Commission and **state leadership demonstrates that it is possible to reduce carbon emissions while growing the economy.** To share what the Energy Commission knows, it has matched energy experts from around the world with counterparts within California. It has participated in international conversations about climate change to learn from others. It hosted the first-ever conference with Germany's leaders to exchange ideas. The Energy Commission's efforts are part of California's ambitious goals to increase international collaboration on preserving natural resources and protecting the environment while encouraging economic development.*



Broadening California's Impact

The Energy Commission participated in the eighth Clean Energy Ministerial in Beijing. At the event, Governor Edmund G. Brown Jr., Energy Commission Chair Robert B. Weisenmiller, Air Resources Board Chair Mary D. Nichols, and California delegates organized a forum to strengthen climate action and advance clean technology, sustainable development, and the transition to low-carbon energy resources. The leaders also hosted the second annual meeting of the Under2 Coalition, a growing group of more than 200 jurisdictions representing 1.3 billion people and 40 percent of the world's GDP, all committed to keeping the increase in global average temperature to below 2 degrees Celsius.

Strengthening Relations With China

The Energy Commission expanded California's clean energy cooperation at the regional level with the Municipality of Shenzhen and the provinces of Sichuan and Jiangsu – the first two Chinese members of the Under2 Coalition – while continuing to strengthen climate action efforts with the Chinese national government that included meeting with China's President Xi Jinping.

Collaborating With Mexico

The Energy Commission signed agreements with the states of Aguascalientes and Jalisco, Mexico, to cooperate on clean energy programs and policies. Aguascalientes and Jalisco signed the Under2 memorandum of understanding.

Partnering With Germany

The Energy Commission teamed with the German Ministry of Economic Affairs and Energy to organize the California-Germany Bilateral Energy Conference, which brought industry experts, think tanks, and policy makers from Germany and California together to discuss recent developments and long-term trends to decarbonize the energy sector.

Hosting International Delegations

The Energy Commission hosted nearly 60 international delegations from around the world to exchange information on climate change, energy efficiency, renewable energy, alternative fuels and transportation, and research and development.



